Center Innovation Fund: AFRC CIF

F-18 Stereo Vision Data collection - FY17

Completed Technology Project (2016 - 2017)

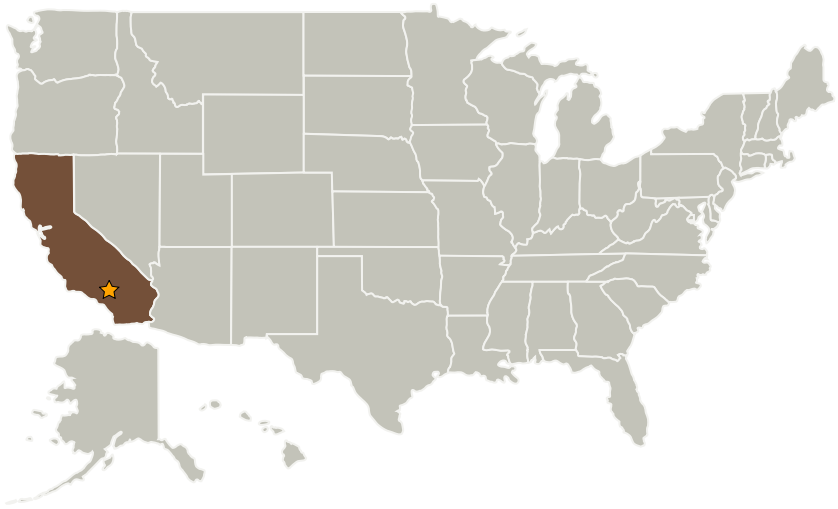
Project Introduction

Technical Approach / Expected Accomplishment:• Use imagery from cameras to provide on-board range maps of terrain• Non-static stereo camera system (wing-tips of aircraft, 2 UAVs as test bed)requires extraction of stereo geometry before applying stereo algorithm• Differential GPS module coupled with each camera to provide distance between cameras and precision time synchronization• Prove of concept on JPL tandem UAV system• Evaluate quality of 3D reconstruction for terrain relative navigation (TRN)and collision avoidance at low altitudes on AFRC fixed-wing aircraft (8ftDROID UAV, AFRC F18 test aircraft – leveraging regular training flights)

Anticipated Benefits

Primary Technical Hurdles:• Accurate time synchronization of distributed stereo system• Real-time camera to camera pose estimation and on-board map construction• Vibration and motion blur analysis for low altitude flight with wing-tip systems

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California

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Table of Contents

F-18 Stereo Vision Data collection - FY17

Completed Technology Project (2016 - 2017)

Primary U.S. Work Locations

California

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Center Innovation Fund: AFRC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

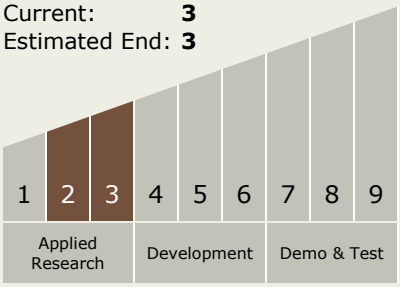
David F Voracek

Principal Investigator:

Daniel S Goodrick

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



F-18 Stereo Vision Data collection - FY17

Completed Technology Project (2016 - 2017)

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.5 Autonomous Rendezvous and Docking
    - TX04.5.1 Relative Navigation Sensors

Target Destination

Earth